Appendix D – Cost Estimates Summary Tables

APPENDIX D – COST ESTIMATES SUMMARY TABLES

Capital, operation and maintenance (O&M), and present worth cost estimates for each alternative are presented in this Appendix. A summary table of these costs for each alternative is provided at the beginning and detailed cost estimates for the components of each alternative are presented following the summary table. Detailed costs are broken down by the various components of each alternative. For example, the costs for Alternative L4 are presented in the following categories: groundwater monitoring capital costs, establishing additional access restrictions and institutional controls, regrading and cover construction capital costs, and O&M costs for groundwater monitoring, cover maintenance, and 5-year CERCLA review. O&M costs for maintaining access restrictions and institutional controls are assumed to be negligible.

In accordance with EPA guidance, the cost estimates for each alternative are order-of-magnitude estimates and are generally accurate within the range specified in the RI/FS guidance of +50/-30 percent. The accuracy of the estimates is subject to substantial variation because details of the specific design will not be known until any remedy is implemented. For example, if a remedy were implemented, the actual site conditions, project scope and schedule, design details, competitive market conditions, changes during construction, labor, material, and equipment rates, and other variables are not known. Also, remedial design efforts might reveal possible cost savings as a result of value engineering studies and reduce the cost of implementing the remedy.

All cost estimates are shown in March 2005 dollars and include a 25 percent costing and scoping contingency. For capital cost items, percentage costs for contractor markup, mobilization/demobilization, and insurance (10 percent); engineering, permitting, and construction management (20 percent); and regulatory oversight (2.5 percent) are added to the estimated construction cost subtotal. Present worth cost estimates (assuming a 7 percent discount rate in accordance with the most recent EPA guidance [USEPA, 2000]) are also provided.

Detail regarding the assumptions used in developing the estimated costs for the various components of the alternatives is provided below.

Groundwater Monitoring. For purposes of preparing a cost estimate, it is assumed that preparation of planning documents would be required for groundwater monitoring. It is assumed that these planning documents would consist of modifications to the existing OU-1 RI/FS Work Plan (McLaren/Hart, 1994) or Additional Sampling and Analysis Plan (EMSI, 1997c) and address the wells to be sampled, parameters to be analyzed, analytical methods, frequency and methodology of sampling, quality assurance/quality control procedures to be employed, and reporting requirements. It is also assumed that a minimal effort associated with securing easements for monitoring would be conducted.

With respect to O&M costs for monitoring, sampling frequencies and proposed wells are discussed in Section 4. It is assumed that samples would be analyzed for gross alpha and beta, uranium isotopes and radium isotopes; the analytical results would be validated; and a brief report of the results would be prepared and submitted.

Institutional Controls. For purposes of preparing a cost estimate, it is assumed that approximately $20,000 of labor would be required to prepare and file the additional deed restriction institutional control discussed in Section 4. A unit price estimate of $24.00 per lineal foot (lf) for the additional fencing (6-foot high chain link with 3-strand barbed wire at top) access restriction under Alternative L2 was obtained from the Means Heavy Construction Cost Data 2004 (R.S. Means, 2003).

Soil Cover and Regrading/Landfill Cover Improvements. For the capital cost estimates developed for Alternatives L2, L3, L4, L5, and L6, it is assumed that a remedial action work plan would be required and that some effort would be necessary to secure access and easements for construction. It is also assumed that geotechnical testing of borrow materials to be used for the cover would be conducted; surveying to layout the site, survey control during regrading and placement of the cover, and record drawings of the top of cover topography would be necessary; and a construction completion report would be prepared at the end of construction. In addition, it is assumed that approximately 800 feet of the berm along the western edge of Area 2 adjacent to the buffer/Crossroad properties would be regraded through placement of additional fill materials from a sideslope of approximately 42 percent to a sideslope of 25 percent. Further, it is assumed that monitoring of site conditions (air flow, meteorological, and radiological), health and safety monitoring of personnel by a health and safety officer, and materials testing (sieve analyses and compaction) would be conducted during regrading and placement of the cover materials.

For placement of the 30-inch soil cover under Alternative L3, it is assumed that because of the compaction factor (i.e., loose cubic yards of soil delivered to the site versus in-place cubic yards of soil after placement and compaction), 40-inches of soil would be required to achieve the 30-inch thickness of soil cover. For the two-foot thick clay layer of the cover improvements under Alternatives L4, L5, and L6, a 20 percent allowance was assumed for compaction and an additional 25 percent allowance was added to account for additional soil anticipated to be required because of settlement of the landfilled materials in some areas of Areas 1 and 2. A 33 percent material compaction allowance was added to the one-foot thick topsoil/vegetative layer that would be placed above the initial two-foot thick soil layer under Alternatives L4, L5, and L6. These compaction allowances were obtained from The Building Estimator's Reference Book (Walker, 1999).

For those construction activities anticipated to occur at the surface of Areas 1 and 2, a 10 percent surcharge was added to the construction cost estimate for the following activities to account for the contractor to be health and safety trained/certified to perform construction activities at a CERCLA site: surveying, silt fence installation, drainage ditch

installation, Area 2 berm regrading, clearing/grubbing/rough grading, addition of soil or regrading to achieve 2% or 5% slopes, and miscellaneous sitework.

Unit prices for other construction activities and materials associated with Alternatives L2, L3, L4, L5, and L6 were obtained from the most recent Means Heavy Construction Cost Data (R.S. Means, 2003), Dodge Unit Cost Guide (Marshall & Swift, 2000), The Building Estimator's Reference Book (Walker, 1999), the Environmental Cost Handling Options and Solutions Assemblies and Unit Cost books (ECHOS, 1995), and/or recent quotes from the Lafarge Rock Quarry in St. Charles, Missouri and are detailed below. For activities where unit cost information was not available, estimates based on EMSI experience at other sites were developed. Unit cost information from references dated prior to April 2004 was updated using Engineering News Record's (ENR's) Construction Cost Index (ENR, 2004).

Activity or Material	Units	Unit Rate ($)
Surveying	crew day	1,000
Silt fence	lineal foot	2.00
Drainage ditch	lineal foot	4.41
Clearing/grubbing	acre	2,100
Rough grading	acre	3,700
6" Rock fill	cubic yard	9.90
Soil fill		
Earth	cubic yard	5.67
Load/haul (5 to 10 miles)	cubic yard	8.97
Spread/Compact	cubic yard	3.49
Total	cubic yard	16.83
Topsoil fill		
Topsoil, purchase and spread	cubic yard	15.49
Load/haul (5 to 10 miles)	cubic yard	8.97
Total	cubic yard	24.46
Fertilize/seed/mulch	acre	1,500
Health & Safety Officer	hour	52.93
Mowing	acre	40.00

With respect to O&M costs for Alternatives L2, L3, L4, L5, and L6, it is estimated that the cover would require mowing three times per year, an annual inspection of the cover surface would be conducted, and an annual inspection report would be prepared. Also, for costing purposes, it is assumed that at an interval of once every five years, a CERCLA

review would be conducted and approximately one acre of the cover would require maintenance and reseeding.

Alternative L1 Cost Estimates

5 - year Review Cost Estimate - First Review
Alternative L1 - No Action

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Costs:				
Labor and expenses	1	LS	20,000	20,000
Subtotal				20,000
Regulatory Oversight	1	LS	5,000	5,000
Estimated Costs Initial 5-year Review - Total				**25,000**

5 - year Review Cost Estimate - Subsequent to Initial Review
Alternative L1 - No Action

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Costs:				
Labor and expenses	1	LS	15,000	15,000
Subtotal				15,000
Regulatory Oversight	1	LS	5,000	5,000
Estimated Costs Subsequent 5-year Reviews - Total				**20,000**

Present Worth Cost Estimate
Alternative L1 - No Action

Year	*n*	P/F(*i*=7%)	5 - year Review Costs: Initial 5-yr Review	5 - year Review Costs: Subsequent 5-yr Reviews	Total Costs ($)	Present Worth of Costs ($)	Cumulative Present Worth ($)
2005	0	1.00000			0	0	0
2006	1	0.93458			0	0	0
2007	2	0.87344			0	0	0
2008	3	0.81630			0	0	0
2009	4	0.76290			0	0	0
2010	5	0.71299	25,000		25,000	18,000	18,000
2011	6	0.66634			0	0	18,000
2012	7	0.62275			0	0	18,000
2013	8	0.58201			0	0	18,000
2014	9	0.54393			0	0	18,000
2015	10	0.50835		20,000	20,000	10,000	28,000
2016	11	0.47509			0	0	28,000
2017	12	0.44401			0	0	28,000
2018	13	0.41496			0	0	28,000
2019	14	0.38782			0	0	28,000
2020	15	0.36245		20,000	20,000	7,000	35,000
2021	16	0.33873			0	0	35,000
2022	17	0.31657			0	0	35,000
2023	18	0.29586			0	0	35,000
2024	19	0.27651			0	0	35,000
2025	20	0.25842		20,000	20,000	5,000	40,000
2026	21	0.24151			0	0	40,000
2027	22	0.22571			0	0	40,000
2028	23	0.21095			0	0	40,000
2029	24	0.19715			0	0	40,000
2030	25	0.18425		20,000	20,000	4,000	44,000
2031	26	0.17220			0	0	44,000
2032	27	0.16093			0	0	44,000
2033	28	0.15040			0	0	44,000
2034	29	0.14056			0	0	44,000
2035	30	0.13137		20,000	20,000	3,000	47,000
Total Estimated Costs:			25,000	100,000			47,000

Alternative L2 Cost Estimates

Capital Cost Estimate
Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Additional Institutional Controls, and Monitoring

(Fence and Cover Repair)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Additional Access Restrictions (fencing)				
Surveying	2	day	1,000	2,000
6' chain link fence and gates - Area 1	2,500	ft	24.00	60,000
6' chain link fence and gates - Area 2	2,300	ft	24.00	55,200
Subtotal - Access Restriction				**117,000**
Existing Cover Repair				
Assume 20% of total area (45.2 ac) of Areas 1 and 2 would require placement of 1' thick of soil to repair and patch existing cover, cover bare spots, and revegetation				
Silt fence	1,920	ft	2.00	3,840
Geotechnical testing of borrow materials	1	ea	2,000	2,000
Perimeter drainage				
Drainage channels	320	lin ft	4.41	1,411
Areas 1 and 2 - Place soil				
Clearing/grubbing/regrading/preparation	9.0	acre	5,800	52,000
Deliver, place and compactsoil	14,585	cu yd	16.83	245,000
Survey control	5	day	1,000	5,000
Materials testing equipment during construction	0.25	month	2,000	1,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	1,000	1,000
Meteorological	0.25	month	2,000	1,000
Radiological (radon, particulates, and radioisotopes)	0.25	month	16,000	4,000
Health and safety monitoring	0.25	month	260,000	65,000
Surveying ("record drawings"	2	day	1,000	2,000
Subtotal - Existing Cover Repair				**383,000**
Estimated Construction Costs - Subtotal				**500,000**
Contractor Markup, Mob/demob, Insurance		%	10	50,000
Engineering, Permitting and Construction Management		%	20	100,000
Regulatory Oversigh		%	2.5	13,000
Estimated Project Capital Costs - Subtotal				**663,000**
Contingency		%	25	166,000
Estimated Fence/Cover Repair Capital Costs - Total				**830,000**

Capital Cost Estimate
Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Additional Institutional Controls, and Monitoring

(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Monitoring Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Monitoring Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Monitoring Capital Costs - Total				**38,000**

Capital Cost Estimate

Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Addition Institutional Controls, and Monitoring

(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Additional ICs Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Additional ICs Capital Costs - Total				**20,000**

Operation and Maintenance Cost Estimate
Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Additional Institutional Controls, and Monitoring

(Monitoring and Cover repair)

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:					
Labor					
Field Technician Labor - groundwater monitoring: 11 wells		12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes		4	days	750	3,000
Materials and equipment					
Groundwater sample kits (11 wells) and filters + 2 duplicates		52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater		4	event	200	800
LEL meter rental - LF gas monitoring		4	event	100	400
Radon carbon cannisters		48	ea	50	2,400
Vehicle		16	days	100	1,600
Shipping of sample coolers		12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)					
Vacuum truck		16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)		220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]					
Gross alpha/beta		56	ea	60	3,360
Isotopic uranium		56	ea	120	6,720
Isotopic thorium		56	ea	120	6,720
Radium-226/Radium-228		56	ea	170	9,520
Volatile organics		56	ea	110	6,160
Semi-volatile organics		56	ea	220	12,320
Metals + Hg		56	ea	90	5,040
TOC		56	ea	45	2,520
Major anions and cations		56	ea	60	3,360
Phosphorus		56	ea	30	1,680
Ammonia		56	ea	35	1,960
Radon gas		48	ea	100	4,800
Full electronic data packages (% of analytical costs)		60,800	%	10%	6,080
Data validation		56	ea	200	11,200
Reporting		4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal					**145,300**
Estimated Annual Cover Repair Costs:					
Bi-annual inspection and report		2	each	6,000	12,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Cover maintenance (1 acre, 1' thick)		1,613	cu yd	16.83	27,000
Reseeding		1	acre	2,000	2,000
Estimated Annual Cover Maintenance Costs - Subtotal					**46,000**
Estimated Annual O&M Costs - Subtotal					**191,000**
Contingency			%	25	48,000
Estimated Annual Monitoring & Cover Repair Costs - Total					**239,000**

5 - year Review Cost Estimate
Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Additional Institutional Controls, and Monitoring

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Costs:				
Labor and expenses	1	LS	15,000	15,000
Subtotal				15,000
Regulatory Oversight	1	LS	5,000	5,000
Estimated Costs Subsequent 5-year Reviews - Total				**20,000**

Present Worth Cost Estimate

Alternative L2 - Cover Repair and Maintenance, Additional Access Restrictions, Additional Institutional Controls, and Monitoring

			Capital Costs ($)				Annual O&M Costs ($/yr)				Present	Cumulative
Year	*n*	P/F(*i*=7%)	Fence and Cover Repair	Monitoring	Institutional Controls	Subtotal Capital Costs	Monitoring and Cover Repair	5 - Year Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	830,000	38,000	20,000	888,000				888,000	888,000	888,000
2006	1	0.93458				0	239,000		239,000	239,000	223,000	1,111,000
2007	2	0.87344				0	239,000		239,000	239,000	209,000	1,320,000
2008	3	0.81630				0	239,000		239,000	239,000	195,000	1,515,000
2009	4	0.76290				0	239,000		239,000	239,000	182,000	1,697,000
2010	5	0.71299				0	239,000	20,000	259,000	259,000	185,000	1,882,000
2011	6	0.66634				0	239,000		239,000	239,000	159,000	2,041,000
2012	7	0.62275				0	239,000		239,000	239,000	149,000	2,190,000
2013	8	0.58201				0	239,000		239,000	239,000	139,000	2,329,000
2014	9	0.54393				0	239,000		239,000	239,000	130,000	2,459,000
2015	10	0.50835				0	239,000	20,000	259,000	259,000	132,000	2,591,000
2016	11	0.47509				0	239,000		239,000	239,000	114,000	2,705,000
2017	12	0.44401				0	239,000		239,000	239,000	106,000	2,811,000
2018	13	0.41496				0	239,000		239,000	239,000	99,000	2,910,000
2019	14	0.38782				0	239,000		239,000	239,000	93,000	3,003,000
2020	15	0.36245				0	239,000	20,000	259,000	259,000	94,000	3,097,000
2021	16	0.33873				0	239,000		239,000	239,000	81,000	3,178,000
2022	17	0.31657				0	239,000		239,000	239,000	76,000	3,254,000
2023	18	0.29586				0	239,000		239,000	239,000	71,000	3,325,000
2024	19	0.27651				0	239,000		239,000	239,000	66,000	3,391,000
2025	20	0.25842				0	239,000	20,000	259,000	259,000	67,000	3,458,000
2026	21	0.24151				0	239,000		239,000	239,000	58,000	3,516,000
2027	22	0.22571				0	239,000		239,000	239,000	54,000	3,570,000
2028	23	0.21095				0	239,000		239,000	239,000	50,000	3,620,000
2029	24	0.19715				0	239,000		239,000	239,000	47,000	3,667,000
2030	25	0.18425				0	239,000	20,000	259,000	259,000	48,000	3,715,000
2031	26	0.17220				0	239,000		239,000	239,000	41,000	3,756,000
2032	27	0.16093				0	239,000		239,000	239,000	38,000	3,794,000
2033	28	0.15040				0	239,000		239,000	239,000	36,000	3,830,000
2034	29	0.14056				0	239,000		239,000	239,000	34,000	3,864,000
2035	30	0.13137				0	239,000	20,000	259,000	259,000	34,000	3,898,000
	Total Estimated Costs:		830,000	38,000	20,000	888,000						3,900,000

Alternative L3 Cost Estimates

Capital Cost Estimate
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential
(Soil Cover)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plan	1	ea	50,000	50,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,200
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,100
Area 2 berm regrading (800 feet)	20,000	cu yd	16.83	336,600
Construct cover				
Clearing/grubbing/regrading/preparation	45.2	acre	5,800	262,000
Deliver, place 30-inch soil cover	228,000	cu yd	16.83	3,837,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	46	day	1,000	46,000
Materials testing equipment during construction	3	month	2,000	6,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	20,000	20,000
Meteorological	6	month	2,000	12,000
Radiological (radon, particulates, and radioisotopes)	3	month	16,000	48,000
Health and safety monitoring	3	month	21,667	65,000
Misc. sitework	1	LS	50,000	50,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Health & safety surcharge for CERCLA site contractor	10	%	1,211,000	121,000
Estimated Construction Costs - Subtotal				**5,052,000**
Contractor Markup, Mob/demob, Insurance		%	10	505,000
Engineering, Permitting and Construction Management		%	20	1,010,000
Regulatory Oversight		%	2.5	126,000
Estimated Project Capital Costs - Subtotal				**6,693,000**
Contingency		%	25	1,673,000
Estimated Project Capital Costs - Total				**8,370,000**

Capital Cost Estimate
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential
(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential
(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Project Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Project Capital Costs - Total				**20,000**

Operation and Maintenance Cost Estimate - Soil Cover
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Bi-annual inspection and report		2	each	6,000	12,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Project O&M Costs - Subtotal					17,000
Contingency			%	25	4,000
Estimated Project O&M Costs - Total					**21,000**

Operation and Maintenance Cost Estimate - Monitoring
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520
Volatile organics	56	ea	110	6,160
Semi-volatile organics	56	ea	220	12,320
Metals + Hg	56	ea	90	5,040
TOC	56	ea	45	2,520
Major anions and cations	56	ea	60	3,360
Phosphorus	56	ea	30	1,680
Ammonia	56	ea	35	1,960
Radon gas	48	ea	100	4,800
Full electronic data packages (% of analytical costs)	60,800	%	10%	6,080
Data validation	56	ea	200	11,200
Reporting	4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal				145,300
Contingency		%	25	36,000
Estimated Annual Monitoring Costs - Total				**181,000**

5 year Maintenance and Review Operation and Maintenance Cost Estimate
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated Project O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated Project O&M Costs - Total				**58,000**

Present Worth Cost Estimate
Alternative L3 - Soil Cover to Address Gamma Exposure and Erosion Potential

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i*=7%)	Soil Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Soil Cover	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	8,370,000	38,000	20,000	8,428,000					8,428,000	8,428,000	8,428,000
2006	1	0.93458				0	21,000	181,000		202,000	202,000	189,000	8,617,000
2007	2	0.87344				0	21,000	181,000		202,000	202,000	176,000	8,793,000
2008	3	0.81630				0	21,000	181,000		202,000	202,000	165,000	8,958,000
2009	4	0.76290				0	21,000	90,500		111,500	111,500	85,000	9,043,000
2010	5	0.71299				0	21,000		58,000	79,000	79,000	56,000	9,099,000
2011	6	0.66634				0	21,000	90,500		111,500	111,500	74,000	9,173,000
2012	7	0.62275				0	21,000			21,000	21,000	13,000	9,186,000
2013	8	0.58201				0	21,000	90,500		111,500	111,500	65,000	9,251,000
2014	9	0.54393				0	21,000			21,000	21,000	11,000	9,262,000
2015	10	0.50835				0	21,000	90,500	58,000	169,500	169,500	86,000	9,348,000
2016	11	0.47509				0	21,000			21,000	21,000	10,000	9,358,000
2017	12	0.44401				0	21,000	90,500		111,500	111,500	50,000	9,408,000
2018	13	0.41496				0	21,000			21,000	21,000	9,000	9,417,000
2019	14	0.38782				0	21,000	90,500		111,500	111,500	43,000	9,460,000
2020	15	0.36245				0	21,000		58,000	79,000	79,000	29,000	9,489,000
2021	16	0.33873				0	21,000	90,500		111,500	111,500	38,000	9,527,000
2022	17	0.31657				0	21,000			21,000	21,000	7,000	9,534,000
2023	18	0.29586				0	21,000	90,500		111,500	111,500	33,000	9,567,000
2024	19	0.27651				0	21,000			21,000	21,000	6,000	9,573,000
2025	20	0.25842				0	21,000	90,500	58,000	169,500	169,500	44,000	9,617,000
2026	21	0.24151				0	21,000			21,000	21,000	5,000	9,622,000
2027	22	0.22571				0	21,000	90,500		111,500	111,500	25,000	9,647,000
2028	23	0.21095				0	21,000			21,000	21,000	4,000	9,651,000
2029	24	0.19715				0	21,000	90,500		111,500	111,500	22,000	9,673,000
2030	25	0.18425				0	21,000		58,000	79,000	79,000	15,000	9,688,000
2031	26	0.17220				0	21,000	90,500		111,500	111,500	19,000	9,707,000
2032	27	0.16093				0	21,000			21,000	21,000	3,000	9,710,000
2033	28	0.15040				0	21,000	90,500		111,500	111,500	17,000	9,727,000
2034	29	0.14056				0	21,000			21,000	21,000	3,000	9,730,000
2035	30	0.13137				0	21,000	90,500	58,000	169,500	169,500	22,000	9,752,000
	Total Estimated Costs:		8,370,000	38,000	20,000	8,430,000							9,800,000

Alternative L4 Cost Estimates

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Regrading and Cover Installation)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plan	1	ea	50,000	50,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,200
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,056
Area 2 berm regrading (800 feet) adjacent to buffer zone	20,000	cu yd	16.83	336,600
Area 1 - Soil fill to achieve minimum 2% grades				
Clearing/grubbing/regrading/preparation	10.4	acre	5,800	60,000
Deliver, place and compactsoil	23,467	cu yd	16.83	395,000
Survey control	5	day	1,000	5,000
Materials testing equipment during construction	0.25	month	2,000	1,000
Area 2 Soil fill to achieve minimum 2% grades				
Clearing/grubbing/regrading/preparation	34.8	acre	5,800	202,000
Deliver, place and compactsoil	88,289	cu yd	16.83	1,486,000
Survey control	18	day	1,000	18,000
Materials testing equipment during construction	1	month	2,000	2,000
Place cover over Areas 1 and 2				
Deliver and place 2' of 6" diameter rock	172,735	cu yd	9.90	1,710,000
Deliver and place soil to fill voids between rock (35% of rock volume)	60,457	cu yd	16.83	1,017,000
Deliver, place and compact 2' of 10^5 compactedsoil	243,008	cu yd	16.83	4,090,000
Deliver, place 1' vegetative growth layer	124,648	cu yd	24.46	3,049,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	122	day	1,000	122,000
Materials testing equipment during construction	7	month	2,000	14,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	20,000	20,000
Meteorological	12	month	2,000	24,000
Radiological (radon, particulates, and radioisotopes)	9	month	16,000	144,000
Health and safety monitoring	9	month	7,222	65,000
Misc. sitework	1	LS	50,000	50,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Health & safety surcharge for CERCLA site contractor	10	%	930,000	93,000
Estimated Construction Costs - Subtotal				**13,152,000**
Contractor Markup, Mob/demob, Insurance		%	10	1,315,000
Engineering, Permitting and Construction Management		%	20	2,630,000
Regulatory Oversight		%	2.5	329,000
Estimated Project Capital Costs - Subtotal				**17,426,000**
Contingency		%	25	4,357,000
Estimated Project Capital Costs - Total				**21,780,000**

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Project Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Capital Costs - Additional Institutional Controls - Total				**20,000**

Operation and Maintenance Cost Estimate - Cover System
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Annual inspection and report		1	each	6,000	6,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Project O&M Costs - Subtotal					11,000
Contingency			%	25	3,000
Estimated Annual Cover Maintenance O&M Costs - Total					**14,000**

Operation and Maintenance Cost Estimate - 5 year Maintenance and Review
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated Project O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated 5-year Maintenance O&M Costs - Total				**58,000**

Operation and Maintenance Cost Estimate - Monitoring
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Groundwater, Radon Gas, and Landfill Gas Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520
Volatile organics	56	ea	110	6,160
Semi-volatile organics	56	ea	220	12,320
Metals + Hg	56	ea	90	5,040
TOC	56	ea	45	2,520
Major anions and cations	56	ea	60	3,360
Phosphorus	56	ea	30	1,680
Ammonia	56	ea	35	1,960
Radon gas	48	ea	100	4,800
Full electronic data packages (% of analytical costs)	60,800	%	10%	6,080
Data validation	56	ea	200	11,200
Reporting	4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal				145,300
Contingency		%	25	36,000
Estimated Annual Monitoring Costs - Total				**181,000**

Present Worth Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i* =7%)	2% Fill and Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Cover Improvements	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	21,780,000	38,000	20,000	21,838,000					21,838,000	21,838,000	21,838,000
2006	1	0.93458				0	14,000	181,000		195,000	195,000	182,000	22,020,000
2007	2	0.87344				0	14,000	181,000		195,000	195,000	170,000	22,190,000
2008	3	0.81630				0	14,000	181,000		195,000	195,000	159,000	22,349,000
2009	4	0.76290				0	14,000	90,500		104,500	104,500	80,000	22,429,000
2010	5	0.71299				0	14,000		58,000	72,000	72,000	51,000	22,480,000
2011	6	0.66634				0	14,000	90,500		104,500	104,500	70,000	22,550,000
2012	7	0.62275				0	14,000			14,000	14,000	9,000	22,559,000
2013	8	0.58201				0	14,000	90,500		104,500	104,500	61,000	22,620,000
2014	9	0.54393				0	14,000			14,000	14,000	8,000	22,628,000
2015	10	0.50835				0	14,000	90,500	58,000	162,500	162,500	83,000	22,711,000
2016	11	0.47509				0	14,000			14,000	14,000	7,000	22,718,000
2017	12	0.44401				0	14,000	90,500		104,500	104,500	46,000	22,764,000
2018	13	0.41496				0	14,000			14,000	14,000	6,000	22,770,000
2019	14	0.38782				0	14,000	90,500		104,500	104,500	41,000	22,811,000
2020	15	0.36245				0	14,000		58,000	72,000	72,000	26,000	22,837,000
2021	16	0.33873				0	14,000	90,500		104,500	104,500	35,000	22,872,000
2022	17	0.31657				0	14,000			14,000	14,000	4,000	22,876,000
2023	18	0.29586				0	14,000	90,500		104,500	104,500	31,000	22,907,000
2024	19	0.27651				0	14,000			14,000	14,000	4,000	22,911,000
2025	20	0.25842				0	14,000	90,500	58,000	162,500	162,500	42,000	22,953,000
2026	21	0.24151				0	14,000			14,000	14,000	3,000	22,956,000
2027	22	0.22571				0	14,000	90,500		104,500	104,500	24,000	22,980,000
2028	23	0.21095				0	14,000			14,000	14,000	3,000	22,983,000
2029	24	0.19715				0	14,000	90,500		104,500	104,500	21,000	23,004,000
2030	25	0.18425				0	14,000		58,000	72,000	72,000	13,000	23,017,000
2031	26	0.17220				0	14,000	90,500		104,500	104,500	18,000	23,035,000
2032	27	0.16093				0	14,000			14,000	14,000	2,000	23,037,000
2033	28	0.15040				0	14,000	90,500		104,500	104,500	16,000	23,053,000
2034	29	0.14056				0	14,000			14,000	14,000	2,000	23,055,000
2035	30	0.13137				0	14,000	90,500	58,000	162,500	162,500	21,000	23,076,000
	Total Estimated Costs:		21,780,000	38,000	20,000	21,840,000							23,100,000

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Regrading and Cover Installation)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plan	1	ea	50,000	50,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,200
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,056
Area 2 berm regrading (800 feet)	20,000	cu yd	16.83	336,600
Area 1 Fill to achieve minimum 2% grades				
Clearing/grubbing/regrading/preparation	10.4	acre	5,800	60,000
Excavate (cut) subsurface material, load trucks and haul to fill area	15,173	in-place yd^3	10.15	154,000
place, spread and compact cut landfill material in fill area	30,346	loose yd^3		
Deliver, place and compact soil needed from offsite	144	cu yd	16.83	2,000
Survey control	7	day	1,000	7,000
Materials testing equipment during construction	1	month	2,000	2,000
Area 2 Cut/fill to achieve minimum 2% grades				
Clearing/grubbing/regrading/preparation	34.8	acre	5,800	202,000
Excavate (cut) subsurface material, load trucks and haul to fill area	125,668	in-place yd^3	10.15	1,276,000
place, spread and compact cut landfill material in fill area	251,336	loose yd^3		
Deliver, place and compact soil needed from offsite	8,527	cu yd	16.83	144,000
Survey control	53	day	1,000	53,000
Materials testing equipment during construction	3	month	2,000	6,000
Place cover over Areas 1 and 2				
Deliver and place 2' of 6" diameter rock	162,915	cu yd	9.90	1,613,000
Deliver and place soil to fill voids between rock (35% of rock volume)	57,020	cu yd	16.83	960,000
Deliver, place and compact 2' of 10^5 compacted soil	225,609	cu yd	16.83	3,797,000
Deliver, place 1' vegetative growth layer	116,861	cu yd	24.46	2,858,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	115	day	1,000	115,000
Materials testing equipment during construction	6	month	2,000	12,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	20,000	20,000
Meteorological	13	month	2,000	26,000
Radiological (radon, particulates, and radioisotopes)	10	month	16,000	160,000
Health and safety monitoring	10	month	6,500	65,000
Misc. sitework	1	LS	50,000	50,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Health & safety surcharge for CERCLA site contractor	10	%	1,481,000	148,000
Estimated Construction Costs - Subtotal				**12,315,000**
Contractor Markup, Mob/demob, Insurance		%	10	1,232,000
Engineering, Permitting and Construction Management		%	20	2,463,000
Regulatory Oversigh		%	2.5	308,000
Estimated Project Capital Costs - Subtotal				**16,318,000**
Contingency		%	25	4,080,000
Estimated Project Capital Costs - Total				**20,400,000**

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installa of a Subtitle D Cover System
(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Project Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Capital Costs - Additional Institutional Controls - Total				**20,000**

Operation and Maintenance Cost Estimate - Cover System
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Annual inspection and report		1	each	6,000	6,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Project O&M Costs - Subtotal					11,000
Contingency			%	25	3,000
Estimated Annual Cover Maintenance O&M Costs - Total					**14,000**

Operation and Maintenance Cost Estimate - 5 year Maintenance and Review
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated Project O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated 5-year Maintenance O&M Costs - Total				**58,000**

Operation and Maintenance Cost Estimate - Monitoring
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System
(Groundwater, Radon Gas, and Landfill Gas Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520
Volatile organics	56	ea	110	6,160
Semi-volatile organics	56	ea	220	12,320
Metals + Hg	56	ea	90	5,040
TOC	56	ea	45	2,520
Major anions and cations	56	ea	60	3,360
Phosphorus	56	ea	30	1,680
Ammonia	56	ea	35	1,960
Radon gas	48	ea	100	4,800
Full electronic data packages (% of analytical costs)	60,800	%	10%	6,080
Data validation	56	ea	200	11,200
Reporting	4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal				145,300
Contingency		%	25	36,000
Estimated Annual Monitoring Costs - Total				**181,000**

Present Worth Cost Estimate
Alternative L4 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 2%) and Installation of a Subtitle D Cover System

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i*=7%)	2% Cut/Fill and Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Cover Improvements	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	20,400,000	38,000	20,000	20,458,000					20,458,000	20,458,000	20,458,000
2006	1	0.93458				0	14,000	181,000		195,000	195,000	182,000	20,640,000
2007	2	0.87344				0	14,000	181,000		195,000	195,000	170,000	20,810,000
2008	3	0.81630				0	14,000	181,000		195,000	195,000	159,000	20,969,000
2009	4	0.76290				0	14,000	90,500		104,500	104,500	80,000	21,049,000
2010	5	0.71299				0	14,000		58,000	72,000	72,000	51,000	21,100,000
2011	6	0.66634				0	14,000	90,500		104,500	104,500	70,000	21,170,000
2012	7	0.62275				0	14,000			14,000	14,000	9,000	21,179,000
2013	8	0.58201				0	14,000	90,500		104,500	104,500	61,000	21,240,000
2014	9	0.54393				0	14,000			14,000	14,000	8,000	21,248,000
2015	10	0.50835				0	14,000	90,500	58,000	162,500	162,500	83,000	21,331,000
2016	11	0.47509				0	14,000			14,000	14,000	7,000	21,338,000
2017	12	0.44401				0	14,000	90,500		104,500	104,500	46,000	21,384,000
2018	13	0.41496				0	14,000			14,000	14,000	6,000	21,390,000
2019	14	0.38782				0	14,000	90,500		104,500	104,500	41,000	21,431,000
2020	15	0.36245				0	14,000		58,000	72,000	72,000	26,000	21,457,000
2021	16	0.33873				0	14,000	90,500		104,500	104,500	35,000	21,492,000
2022	17	0.31657				0	14,000			14,000	14,000	4,000	21,496,000
2023	18	0.29586				0	14,000	90,500		104,500	104,500	31,000	21,527,000
2024	19	0.27651				0	14,000			14,000	14,000	4,000	21,531,000
2025	20	0.25842				0	14,000	90,500	58,000	162,500	162,500	42,000	21,573,000
2026	21	0.24151				0	14,000			14,000	14,000	3,000	21,576,000
2027	22	0.22571				0	14,000	90,500		104,500	104,500	24,000	21,600,000
2028	23	0.21095				0	14,000			14,000	14,000	3,000	21,603,000
2029	24	0.19715				0	14,000	90,500		104,500	104,500	21,000	21,624,000
2030	25	0.18425				0	14,000		58,000	72,000	72,000	13,000	21,637,000
2031	26	0.17220				0	14,000	90,500		104,500	104,500	18,000	21,655,000
2032	27	0.16093				0	14,000			14,000	14,000	2,000	21,657,000
2033	28	0.15040				0	14,000	90,500		104,500	104,500	16,000	21,673,000
2034	29	0.14056				0	14,000			14,000	14,000	2,000	21,675,000
2035	30	0.13137				0	14,000	90,500	58,000	162,500	162,500	21,000	21,696,000
	Total Estimated Costs:		20,400,000	38,000	20,000	20,460,000							21,700,000

Alternative L5 Cost Estimates

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Regrading and Cover Installation)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plan	1	ea	50,000	50,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,200
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,056
Area 2 berm regrading (800 feet) adjacent to buffer zone	20,000	cu yd	16.83	336,600
Area 1 - Soil fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	10.4	acre	5,800	60,000
Deliver, place and compactsoil	51,200	cu yd	16.83	862,000
Survey control	11	day	1,000	11,000
Materials testing equipment during construction	0.55	month	2,000	1,000
Area 2 Soil fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	34.8	acre	5,800	202,000
Deliver, place and compactsoil	239,597	cu yd	16.83	4,032,000
Survey control	48	day	1,000	48,000
Materials testing equipment during construction	3	month	2,000	6,000
Place cover over Areas 1 and 2				
Deliver and place 2' of 6" diameter rock	148,287	cu yd	9.90	1,468,000
Deliver and place soil to fill voids between rock (35% of rock volume)	51,900	cu yd	16.83	873,000
Deliver, place and compact 2' of 10^5 compactedsoil	206,397	cu yd	16.83	3,474,000
Deliver, place 1' vegetative growth layer	107,534	cu yd	24.46	2,630,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	103	day	1,000	103,000
Materials testing equipment during construction	6	month	2,000	12,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	20,000	20,000
Meteorological	13	month	2,000	26,000
Radiological (radon, particulates, and radioisotopes)	10	month	16,000	160,000
Health and safety monitoring	10	month	6,500	65,000
Misc. sitework	1	LS	50,000	50,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Health & safety surcharge for CERCLA site contractor	10	%	1,261,000	126,000
Estimated Construction Costs - Subtotal				**14,814,000**
Contractor Markup, Mob/demob, Insurance		%	10	1,481,000
Engineering, Permitting and Construction Management		%	20	2,963,000
Regulatory Oversight		%	2.5	370,000
Estimated Project Capital Costs - Subtotal				**19,628,000**
Contingency		%	25	4,907,000
Estimated Project Capital Costs - Total				**24,540,000**

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installatio of a Subtitle D Cover System
(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Project Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Capital Costs - Additional Institutional Controls - Total				**20,000**

Operation and Maintenance Cost Estimate - Cover System
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Annual inspection and report		1	each	6,000	6,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Project O&M Costs - Subtotal					11,000
Contingency			%	25	3,000
Estimated Annual Cover Maintenance O&M Costs - Total					**14,000**

Operation and Maintenance Cost Estimate - 5 year Maintenance and Review
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated Project O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated 5-year Maintenance O&M Costs - Total				**58,000**

Operation and Maintenance Cost Estimate - Monitoring
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Groundwater, Radon Gas, and Landfill Gas Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520
Volatile organics	56	ea	110	6,160
Semi-volatile organics	56	ea	220	12,320
Metals + Hg	56	ea	90	5,040
TOC	56	ea	45	2,520
Major anions and cations	56	ea	60	3,360
Phosphorus	56	ea	30	1,680
Ammonia	56	ea	35	1,960
Radon gas	48	ea	100	4,800
Full electronic data packages (% of analytical costs)	60,800	%	10%	6,080
Data validation	56	ea	200	11,200
Reporting	4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal				145,300
Contingency		%	25	36,000
Estimated Annual Monitoring Costs - Total				**181,000**

Present Worth Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut to minimum slope of 5%) and Installation of a Subtitle D Cover System

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i* =7%)	5% Fill and Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Cover Improvements	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	24,540,000	38,000	20,000	24,598,000					24,598,000	24,598,000	24,598,000
2006	1	0.93458				0	14,000	181,000		195,000	195,000	182,000	24,780,000
2007	2	0.87344				0	14,000	181,000		195,000	195,000	170,000	24,950,000
2008	3	0.81630				0	14,000	181,000		195,000	195,000	159,000	25,109,000
2009	4	0.76290				0	14,000	90,500		104,500	104,500	80,000	25,189,000
2010	5	0.71299				0	14,000		58,000	72,000	72,000	51,000	25,240,000
2011	6	0.66634				0	14,000	90,500		104,500	104,500	70,000	25,310,000
2012	7	0.62275				0	14,000			14,000	14,000	9,000	25,319,000
2013	8	0.58201				0	14,000	90,500		104,500	104,500	61,000	25,380,000
2014	9	0.54393				0	14,000			14,000	14,000	8,000	25,388,000
2015	10	0.50835				0	14,000	90,500	58,000	162,500	162,500	83,000	25,471,000
2016	11	0.47509				0	14,000			14,000	14,000	7,000	25,478,000
2017	12	0.44401				0	14,000	90,500		104,500	104,500	46,000	25,524,000
2018	13	0.41496				0	14,000			14,000	14,000	6,000	25,530,000
2019	14	0.38782				0	14,000	90,500		104,500	104,500	41,000	25,571,000
2020	15	0.36245				0	14,000		58,000	72,000	72,000	26,000	25,597,000
2021	16	0.33873				0	14,000	90,500		104,500	104,500	35,000	25,632,000
2022	17	0.31657				0	14,000			14,000	14,000	4,000	25,636,000
2023	18	0.29586				0	14,000	90,500		104,500	104,500	31,000	25,667,000
2024	19	0.27651				0	14,000			14,000	14,000	4,000	25,671,000
2025	20	0.25842				0	14,000	90,500	58,000	162,500	162,500	42,000	25,713,000
2026	21	0.24151				0	14,000			14,000	14,000	3,000	25,716,000
2027	22	0.22571				0	14,000	90,500		104,500	104,500	24,000	25,740,000
2028	23	0.21095				0	14,000			14,000	14,000	3,000	25,743,000
2029	24	0.19715				0	14,000	90,500		104,500	104,500	21,000	25,764,000
2030	25	0.18425				0	14,000		58,000	72,000	72,000	13,000	25,777,000
2031	26	0.17220				0	14,000	90,500		104,500	104,500	18,000	25,795,000
2032	27	0.16093				0	14,000			14,000	14,000	2,000	25,797,000
2033	28	0.15040				0	14,000	90,500		104,500	104,500	16,000	25,813,000
2034	29	0.14056				0	14,000			14,000	14,000	2,000	25,815,000
2035	30	0.13137				0	14,000	90,500	58,000	162,500	162,500	21,000	25,836,000
	Total Estimated Costs:		24,540,000	38,000	20,000	24,600,000							25,800,000

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Regrading and Cover Installation)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plan	1	ea	50,000	50,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,200
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,056
Area 2 berm regrading (800 feet)	20,000	cu yd	16.83	336,600
Area 1 Cut/fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	10.4	acre	5,800	60,000
Excavate (cut) subsurface material, load trucks and haul to fill area	16,696	in-place yd^3	10.15	169,000
place, spread and compact cut landfill material in fill area	33,392	loose yd^3		
Deliver, place and compact soil needed from offsite	0	cu yd	16.83	0
Survey control	7	day	1,000	7,000
Materials testing equipment during construction	1	month	2,000	2,000
Area 2 Cut/fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	34.8	acre	5,800	202,000
Excavate (cut) subsurface material, load trucks and haul to fill area	115,169	in-place yd^3	10.15	1,169,000
place, spread and compact cut landfill material in fill area	230,338	loose yd^3		
Deliver, place and compact soil needed from offsite	0	cu yd	16.83	0
Survey control	47	day	1,000	47,000
Materials testing equipment during construction	3	month	2,000	6,000
Place cover over Areas 1 and 2				
Deliver and place 2' of 6" diameter rock	162,400	cu yd	9.90	1,608,000
Deliver and place soil to fill voids between rock (35% of rock volume)	56,840	cu yd	16.83	957,000
Deliver, place and compact 2' of 10^{-5} compacted soil	224,444	cu yd	16.83	3,777,000
Deliver, place 1' vegetative growth layer	113,555	cu yd	24.46	2,778,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	113	day	1,000	113,000
Materials testing equipment during construction	6	month	2,000	12,000
Monitoring during construction				
Continuous monitoring/recording of air flow	1	LS	20,000	20,000
Meteorological	13	month	2,000	26,000
Radiological (radon, particulates, and radioisotopes)	10	month	16,000	160,000
Health and safety monitoring	10	month	6,500	65,000
Misc. sitework	1	LS	50,000	50,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Health & safety surcharge for CERCLA site contractor	10	%	1,687,000	169,000
Estimated Construction Costs - Subtotal				**11,982,000**
Contractor Markup, Mob/demob, Insurance		%	10	1,198,000
Engineering, Permitting and Construction Management		%	20	2,396,000
Regulatory Oversight		%	2.5	300,000
Estimated Project Capital Costs - Subtotal				**15,876,000**
Contingency		%	25	3,969,000
Estimated Project Capital Costs - Total				**19,850,000**

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installa of a Subtitle D Cover System
(Additional Institutional Controls)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Project Capital Costs - Subtotal				16,000
Contingency		%	25	4,000
Estimated Capital Costs - Additional Institutional Controls - Total				**20,000**

Operation and Maintenance Cost Estimate - Cover System
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Annual inspection and report		1	each	6,000	6,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Project O&M Costs - Subtotal					11,000
Contingency			%	25	3,000
Estimated Annual Cover Maintenance O&M Costs - Total					**14,000**

Operation and Maintenance Cost Estimate - 5 year Maintenance and Review
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated Project O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated 5-year Maintenance O&M Costs - Total				**58,000**

Operation and Maintenance Cost Estimate - Monitoring
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System
(Groundwater, Radon Gas, and Landfill Gas Monitoring)

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520
Volatile organics	56	ea	110	6,160
Semi-volatile organics	56	ea	220	12,320
Metals + Hg	56	ea	90	5,040
TOC	56	ea	45	2,520
Major anions and cations	56	ea	60	3,360
Phosphorus	56	ea	30	1,680
Ammonia	56	ea	35	1,960
Radon gas	48	ea	100	4,800
Full electronic data packages (% of analytical costs)	60,800	%	10%	6,080
Data validation	56	ea	200	11,200
Reporting	4	events	10,000	40,000
Estimated Annual Monitoring Costs - Subtotal				145,300
Contingency		%	25	36,000
Estimated Annual Monitoring Costs - Total				**181,000**

Present Worth Cost Estimate
Alternative L5 - Regrading of Areas 1 and 2 (cut/fill to minimum slope of 5%) and Installation of a Subtitle D Cover System

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i* =7%)	5% Cut/Fill and Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Cover Improvements	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	19,850,000	38,000	20,000	19,908,000					19,908,000	19,908,000	19,908,000
2006	1	0.93458				0	14,000	181,000		195,000	195,000	182,000	20,090,000
2007	2	0.87344				0	14,000	181,000		195,000	195,000	170,000	20,260,000
2008	3	0.81630				0	14,000	181,000		195,000	195,000	159,000	20,419,000
2009	4	0.76290				0	14,000	90,500		104,500	104,500	80,000	20,499,000
2010	5	0.71299				0	14,000		58,000	72,000	72,000	51,000	20,550,000
2011	6	0.66634				0	14,000	90,500		104,500	104,500	70,000	20,620,000
2012	7	0.62275				0	14,000			14,000	14,000	9,000	20,629,000
2013	8	0.58201				0	14,000	90,500		104,500	104,500	61,000	20,690,000
2014	9	0.54393				0	14,000			14,000	14,000	8,000	20,698,000
2015	10	0.50835				0	14,000	90,500	58,000	162,500	162,500	83,000	20,781,000
2016	11	0.47509				0	14,000			14,000	14,000	7,000	20,788,000
2017	12	0.44401				0	14,000	90,500		104,500	104,500	46,000	20,834,000
2018	13	0.41496				0	14,000			14,000	14,000	6,000	20,840,000
2019	14	0.38782				0	14,000	90,500		104,500	104,500	41,000	20,881,000
2020	15	0.36245				0	14,000		58,000	72,000	72,000	26,000	20,907,000
2021	16	0.33873				0	14,000	90,500		104,500	104,500	35,000	20,942,000
2022	17	0.31657				0	14,000			14,000	14,000	4,000	20,946,000
2023	18	0.29586				0	14,000	90,500		104,500	104,500	31,000	20,977,000
2024	19	0.27651				0	14,000			14,000	14,000	4,000	20,981,000
2025	20	0.25842				0	14,000	90,500	58,000	162,500	162,500	42,000	21,023,000
2026	21	0.24151				0	14,000			14,000	14,000	3,000	21,026,000
2027	22	0.22571				0	14,000	90,500		104,500	104,500	24,000	21,050,000
2028	23	0.21095				0	14,000			14,000	14,000	3,000	21,053,000
2029	24	0.19715				0	14,000	90,500		104,500	104,500	21,000	21,074,000
2030	25	0.18425				0	14,000		58,000	72,000	72,000	13,000	21,087,000
2031	26	0.17220				0	14,000	90,500		104,500	104,500	18,000	21,105,000
2032	27	0.16093				0	14,000			14,000	14,000	2,000	21,107,000
2033	28	0.15040				0	14,000	90,500		104,500	104,500	16,000	21,123,000
2034	29	0.14056				0	14,000			14,000	14,000	2,000	21,125,000
2035	30	0.13137				0	14,000	90,500	58,000	162,500	162,500	21,000	21,146,000
	Total Estimated Costs:		19,850,000	38,000	20,000	19,910,000							21,100,000

Alternative L6 Cost Estimates

Capital Cost Estimate

Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetation layer Cover System

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Work Plans (FSP, QAPP, CQCP, HSP)	1	ea	150,000	150,000
Surveying (site layout)	14	day	1,000	14,000
Secure access/easements	1	LS	10,000	10,000
Silt fence	9,600	ft	2.00	19,000
Establish staging area to load trucks	1	LS	10,000	10,000
Excavate subsurface material	42,430	cu yd	4.00	170,000
Load trucks with excavated material	84,860	cu yd	1.00	85,000
Truck hauling of excavated material to railyard	31,823	ton	7.10	226,000
Construct loading facility at railyard (truck to railcar)	1	LS	250,000	250,000
Transfer from truck to railcar	31,823	ton	2.00	64,000
Rail haul to disposal facility (Barnwell, SC)	50,916,800	ton-mile	0.15	7,638,000
Disposal fee (debris)	84,860	cu yd	353.49	29,997,000
Backfill excavated areas w/ imported fill	56,573	cu yd	16.83	952,000
Geotechnical testing of borrow materials	1	ea	20,000	20,000
Perimeter drainage				
Drainage channels	1,600	lin ft	4.41	7,000
Area 2 berm regrading (800 feet) adjacent to buffer zone	20,000	cu yd	16.83	337,000
Area 1 - Soil fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	10.4	acre	5,800	60,000
Deliver, place and compact soil	51,200	cu yd	16.83	862,000
Survey control	11	day	1,000	11,000
Materials testing equipment during construction	0.55	month	2,000	1,000
Area 2 Soil fill to achieve minimum 5% grades				
Clearing/grubbing/regrading/preparation	34.8	acre	5,800	202,000
Deliver, place and compact soil	239,597	cu yd	16.83	4,032,000
Survey control	48	day	1,000	48,000
Materials testing equipment during construction	3	month	2,000	6,000
Place cover over Areas 1 and 2				
Deliver and place 2' of 6" diameter rock	148,287	cu yd	9.90	1,468,000
Deliver and place soil to fill voids between rock (35% of rock volume)	51,900	cu yd	16.83	873,000
Deliver, place and compact 2' of 10^5 compacted soil	206,397	cu yd	16.83	3,474,000
Deliver, place 1' vegetative growth layer	107,534	cu yd	24.46	2,630,000
Fertilize/seeding/mulching	45.2	acre	1,500	68,000
Survey control	103	day	1,000	103,000
Materials testing equipment during construction	6	month	2,000	12,000
Misc. sitework	1	LS	50,000	50,000
Monitoring during construction				
Confirmatory sampling of excavation	4.4	acre	7,000	31,000
Meteorological	13	month	2,000	26,000
Radiological (radon, particulates, and radioisotopes)	10	month	16,000	160,000
Health and safety monitoring	10	month	6,500	65,000
Health & safety surcharge for CERCLA site contractor	10	%	1,737,000	174,000
Surveying ("record drawings")	10	day	1,000	10,000
Construction Completion Report	1	LS	50,000	50,000
Estimated Construction Costs - Subtotal				54,365,000
Contractor Markup, Mob/demob, Insurance **		%	10	1,673,000
Engineering, Permitting and Construction Management **		%	20	3,346,000
Regulatory Oversight **		%	2.5	418,000
Estimated Project Capital Costs - Subtotal				59,800,000
Contingency		%	25	14,950,000
Preliminary Estimated Project Capital Costs - Total				**75,000,000**

** Note: Indirect costs not taken on rail haul and disposal fee.

Capital Cost Estimate
Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetati layer Cover System
Monitoring

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Planning documents	1	LS	10,000	10,000
Secure easements	1	LS	1,000	1,000
Install/develop new groundwater monitoring wells S-8, I-62, D-83	180	feet	60	10,800
Install radon and landfill gas monitoring probes, 20' deep each	12	ea	650	7,800
Estimated Capital Costs - Subtotal				30,000
Contingency		%	25	8,000
Estimated Project Capital Costs - Total				**38,000**

Capital Cost Estimate
Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' veget layer Cover System
Additional Institutional Controls

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Capital Costs:				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Estimated Capital Costs - Additional Institutional Controls - Subtotal				16,000
Contingency		%	25	4,000
Estimated Capital Costs - Additional Institutional Controls - Total				**20,000**

Operation and Maintenance Cost Estimate
Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetation layer Cover System
Cover System

Description		Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Operation & Maintenance Costs:					
Annual inspection and report		1	each	6,000	6,000
Mowing (3 times/year)	3	45.2	acre	40	5,000
Estimated Annual Cover Maintenance O&M Costs - Subtotal					11,000
Contingency			%	25	3,000
Estimated Annual Cover Maintenance O&M Costs - Total					**14,000**

Operation and Maintenance Cost Estimate
Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetation layer Cover System
5 year Maintenance and Review

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Cover maintenance (1 acre, 1' thick)	1,613	cu yd	15	24,000
Reseeding	1	acre	2,000	2,000
5-year review	1	each	20,000	20,000
Estimated 5-year Maintenance and Review O&M Costs - Subtotal				46,000
Contingency		%	25	12,000
Estimated 5-year Maintenance and Review O&M Costs - Total				**58,000**

Operation and Maintenance Cost Estimate
Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetation layer Cover System
Groundwater, Radon Gas, and Landfill Gas Monitoring

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Annual Monitoring Costs:				
Labor				
Field Technician Labor - groundwater monitoring: 11 wells	12	days	750	9,000
Field Technician Labor - radon and LF gas: 12 probes	4	days	750	3,000
Materials and equipment				
Groundwater sample kits (11 wells) and filters + 2 duplicates	52	ea	75	3,900
Field instrumentation and flowcell rental - groundwater	4	event	200	800
LEL meter rental - LF gas monitoring	4	event	100	400
Radon carbon cannisters	48	ea	50	2,400
Vehicle	16	days	100	1,600
Shipping of sample coolers	12	ship days	100	1,200
Disposal of purge water (assumes PE tank previously purchased is onsite)				
Vacuum truck	16	hr	90	1,440
Transportation and disposal (assumes approx 5 gal per well per event)	220	gallon	0.45	99
Analytical (28-day turn around time) [includes 2 duplicates and field blank]				
Gross alpha/beta	56	ea	60	3,360
Isotopic uranium	56	ea	120	6,720
Isotopic thorium	56	ea	120	6,720
Radium-226/Radium-228	56	ea	170	9,520

Present Worth Cost Estimate

Alternative L6 - Excavation of Material with Higher Levels of Radioactivity from Area 2; and Regrading of Areas 1 and 2 (fill to 5% slope) and Installation of a 2' rock/2' clay/1' vegetation layer Cover System

			Capital Costs ($)				Annual Operation and Maintenance Costs ($/yr)					Present	Cumulative
Year	*n*	P/F(*i* =7%)	Excavate + 5% Fill and Cover	Monitoring	Institutional Controls	Subtotal Capital Costs	Cover Improvements	Monitoring	5 year Main + Review	Subtotal O&M Costs	Total Costs ($)	Worth of Costs ($)	Present Worth ($)
2005	0	1.00000	75,000,000	38,000	20,000	75,060,000					75,060,000	75,060,000	75,060,000
2006	1	0.93458				0	14,000	181,000		195,000	195,000	182,000	75,242,000
2007	2	0.87344				0	14,000	181,000		195,000	195,000	170,000	75,412,000
2008	3	0.81630				0	14,000	181,000		195,000	195,000	159,000	75,571,000
2009	4	0.76290				0	14,000	90,500		104,500	104,500	80,000	75,651,000
2010	5	0.71299				0	14,000		58,000	72,000	72,000	51,000	75,702,000
2011	6	0.66634				0	14,000	90,500		104,500	104,500	70,000	75,772,000
2012	7	0.62275				0	14,000			14,000	14,000	9,000	75,781,000
2013	8	0.58201				0	14,000	90,500		104,500	104,500	61,000	75,842,000
2014	9	0.54393				0	14,000			14,000	14,000	8,000	75,850,000
2015	10	0.50835				0	14,000	90,500	58,000	162,500	162,500	83,000	75,933,000
2016	11	0.47509				0	14,000			14,000	14,000	7,000	75,940,000
2017	12	0.44401				0	14,000	90,500		104,500	104,500	46,000	75,986,000
2018	13	0.41496				0	14,000			14,000	14,000	6,000	75,992,000
2019	14	0.38782				0	14,000	90,500		104,500	104,500	41,000	76,033,000
2020	15	0.36245				0	14,000		58,000	72,000	72,000	26,000	76,059,000
2021	16	0.33873				0	14,000	90,500		104,500	104,500	35,000	76,094,000
2022	17	0.31657				0	14,000			14,000	14,000	4,000	76,098,000
2023	18	0.29586				0	14,000	90,500		104,500	104,500	31,000	76,129,000
2024	19	0.27651				0	14,000			14,000	14,000	4,000	76,133,000
2025	20	0.25842				0	14,000	90,500	58,000	162,500	162,500	42,000	76,175,000
2026	21	0.24151				0	14,000			14,000	14,000	3,000	76,178,000
2027	22	0.22571				0	14,000	90,500		104,500	104,500	24,000	76,202,000
2028	23	0.21095				0	14,000			14,000	14,000	3,000	76,205,000
2029	24	0.19715				0	14,000	90,500		104,500	104,500	21,000	76,226,000
2030	25	0.18425				0	14,000		58,000	72,000	72,000	13,000	76,239,000
2031	26	0.17220				0	14,000	90,500		104,500	104,500	18,000	76,257,000
2032	27	0.16093				0	14,000			14,000	14,000	2,000	76,259,000
2033	28	0.15040				0	14,000	90,500		104,500	104,500	16,000	76,275,000
2034	29	0.14056				0	14,000			14,000	14,000	2,000	76,277,000
2035	30	0.13137				0	14,000	90,500	58,000	162,500	162,500	21,000	76,298,000
	Total Estimated Costs:		75,000,000	38,000	20,000	75,100,000							76,000,000

Alternative F1 Cost Estimates

Capital Cost Estimate
Alternative F1 - No Action
(Soil Sampling)

Description	Quantity	Units	Unit Rate	Estimated Cost
Soil Sampling: 1 sample per 10 sq meters (196,000 sq ft area)				
Labor				
Field Technician Labor - assume 6 samples per hour	33	hour	75	2,500
Materials and equipment				
Soil sample kits	200	ea	5	1,000
Field instrumentation - gamma meter	4	day	100	400
Vehicle	4	days	100	400
Shipping of sample coolers	4	ship days	100	400
Analytical (28-day turn around time) [includes 1 duplicate per 10 samples]				
Isotopic uranium	220	ea	120	26,400
Isotopic thorium	220	ea	120	26,400
Radium-226/Radium-228	220	ea	170	37,400
Full electronic data packages (% of analytical costs)	90,200	%	10%	9,020
Data validation	220	ea	55	12,100
Reporting	1	event	10,000	10,000
Estimated Capital Costs - Subtotal				**126,000**
Contingency		%	25	32,000
Estimated Capital Costs - Total				**158,000**

Present Worth Cost Estimate
Alternative F1 - No Action

Year	*n*	P/F(*i*=7%)	Capital Costs ($) Soil Sampling	O&M Costs ($/yr)	Total Costs ($)	Present Worth of Costs ($)	Cumulative Present Worth ($)
2005	0	1.00000	158,000		158,000	158,000	158,000
2006	1	0.93458		0	0	0	158,000
2007	2	0.87344		0	0	0	158,000
2008	3	0.81630		0	0	0	158,000
2009	4	0.76290		0	0	0	158,000
2010	5	0.71299		0	0	0	158,000
2011	6	0.66634		0	0	0	158,000
2012	7	0.62275		0	0	0	158,000
2013	8	0.58201		0	0	0	158,000
2014	9	0.54393		0	0	0	158,000
2015	10	0.50835		0	0	0	158,000
2016	11	0.47509		0	0	0	158,000
2017	12	0.44401		0	0	0	158,000
2018	13	0.41496		0	0	0	158,000
2019	14	0.38782		0	0	0	158,000
2020	15	0.36245		0	0	0	158,000
2021	16	0.33873		0	0	0	158,000
2022	17	0.31657		0	0	0	158,000
2023	18	0.29586		0	0	0	158,000
2024	19	0.27651		0	0	0	158,000
2025	20	0.25842		0	0	0	158,000
2026	21	0.24151		0	0	0	158,000
2027	22	0.22571		0	0	0	158,000
2028	23	0.21095		0	0	0	158,000
2029	24	0.19715		0	0	0	158,000
2030	25	0.18425		0	0	0	158,000
2031	26	0.17220		0	0	0	158,000
2032	27	0.16093		0	0	0	158,000
2033	28	0.15040		0	0	0	158,000
2034	29	0.14056		0	0	0	158,000
2035	30	0.13137		0	0	0	158,000
	Total Estimated Costs:		158,000				158,000

Alternative F2 Cost Estimates

Capital Cost Estimate
Alternative F2 - Institutional and Access Controls
(Soil Sampling, Establish Institutional Controls, Fence for Access Restriction)

Description	Quantity	Units	Unit Rate	Estimated Cost
Soil Sampling: 1 sample per 10 sq meters (196,000 sq ft area)				
Labor				
Field Technician Labor - assume 6 samples per hour	33	hour	75	2,500
Materials and equipment				
Soil sample kits	200	ea	5	1,000
Field instrumentation - gamma meter	4	day	100	400
Vehicle	4	days	100	400
Shipping of sample coolers	4	ship days	100	400
Analytical (28-day turn around time) [includes 1 duplicate per 10 samples]				
Isotopic uranium	220	ea	120	26,400
Isotopic thorium	220	ea	120	26,400
Radium-226/Radium-228	220	ea	170	37,400
Full electronic data packages (% of analytical costs)	90,200	%	10%	9,020
Data validation	220	ea	55	12,100
Reporting	1	event	10,000	10,000
Subtotal - Soil Sampling				**126,000**
Fence for Access Restriction				
6' chain link fence and gates	900	ft	24.00	21,600
Subtotal - Access Restriction				**21,600**
Institutional Controls				
Labor to establish Institutional Controls	1	LS	16,000	16,000
Subtotal - Institutional Controls				**16,000**
Estimated Capital Costs - Subtotal				**163,600**
Contingency		%	25	41,000
Estimated Capital Costs - Total				**205,000**

Operation and Maintenance and 5-year Review Cost Estimates
Alternative F2 - Institutional and Access Controls

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Land use monitoring (inspection) and letter report	1	each	3,000	3,000
Enforcement of Institutional Controls (attorney fees)	1	year	1,500	1,500
Estimated O&M Costs - Subtotal				4,500
Contingency		%	25	1,100
Estimated O&M Costs - Total				**5,600**

Present Worth Cost Estimate
Alternative F2 - Institutional and Access Controls

Year	*n*	P/F(*i*=7%)	Estimated Capital Costs ($)	Estimated O&M Costs ($/yr)	Estimated 5 - year Review Costs ($)	Total Costs ($)	Present Worth of Costs ($)	Cumulative Present Worth ($)
2005	0	1.00000	205,000			205,000	205,000	205,000
2006	1	0.93458		5,600		5,600	5,000	210,000
2007	2	0.87344		5,600		5,600	5,000	215,000
2008	3	0.81630		5,600		5,600	5,000	220,000
2009	4	0.76290		5,600		5,600	4,000	224,000
2010	5	0.71299		5,600	8,100	13,700	10,000	234,000
2011	6	0.66634		5,600		5,600	4,000	238,000
2012	7	0.62275		5,600		5,600	3,000	241,000
2013	8	0.58201		5,600		5,600	3,000	244,000
2014	9	0.54393		5,600		5,600	3,000	247,000
2015	10	0.50835		5,600	8,100	13,700	7,000	254,000
2016	11	0.47509		5,600		5,600	3,000	257,000
2017	12	0.44401		5,600		5,600	2,000	259,000
2018	13	0.41496		5,600		5,600	2,000	261,000
2019	14	0.38782		5,600		5,600	2,000	263,000
2020	15	0.36245		5,600	8,100	13,700	5,000	268,000
2021	16	0.33873		5,600		5,600	2,000	270,000
2022	17	0.31657		5,600		5,600	2,000	272,000
2023	18	0.29586		5,600		5,600	2,000	274,000
2024	19	0.27651		5,600		5,600	2,000	276,000
2025	20	0.25842		5,600	8,100	13,700	4,000	280,000
2026	21	0.24151		5,600		5,600	1,000	281,000
2027	22	0.22571		5,600		5,600	1,000	282,000
2028	23	0.21095		5,600		5,600	1,000	283,000
2029	24	0.19715		5,600		5,600	1,000	284,000
2030	25	0.18425		5,600	8,100	13,700	3,000	287,000
2031	26	0.17220		5,600		5,600	1,000	288,000
2032	27	0.16093		5,600		5,600	1,000	289,000
2033	28	0.15040		5,600		5,600	1,000	290,000
2034	29	0.14056		5,600		5,600	1,000	291,000
2035	30	0.13137		5,600	8,100	13,700	2,000	293,000
	Total Estimated Costs:		205,000					290,000

Alternative F3 Cost Estimates

Capital Cost Estimate
Alternative F3 - Capping and Institutional and Access Controls
(Soil Sampling, Establish Institutional Controls, Fence of Access Restriction, and Capping)

Description	Quantity	Units	Unit Rate	Estimated Cost
Soil Sampling: 1 sample per 10 sq meters (196,000 sq ft area)				
Labor				
Field Technician Labor - assume 6 samples per hour	33	hour	75	2,500
Materials and equipment				
Soil sample kits	200	ea	5	1,000
Field instrumentation - gamma meter	4	day	100	400
Vehicle	4	days	100	400
Shipping of sample coolers	4	ship days	100	400
Analytical (28-day turn around time) [includes 1 duplicate per 10 samples]				
Isotopic uranium	220	ea	120	26,400
Isotopic thorium	220	ea	120	26,400
Radium-226/Radium-228	220	ea	170	37,400
Full electronic data packages (% of analytical costs)	90,200	%	10%	9,020
Data validation	220	ea	55	12,100
Reporting	1	event	10,000	10,000
Subtotal - Soil Sampling				**126,000**
Institutional Controls				
Labor to establish Institutional Control	1	LS	16,000	16,000
Subtotal - Institutional Controls				**16,000**
Fence for Access Restriction				
6' chain link fence and gates	900	ft	24.00	21,600
Subtotal - Access Restriction				**21,600**
Capping				
Surveying	2	day	1,000	2,000
Silt fence	7,000	ft	2.00	14,000
Clearing/grubbing/regrading/preparation	4.50	acre	5,800	26,000
Deliver, place 6-inches grave	3,630	cu yd	10.00	36,000
Subtotal - Capping Construction Costs				78,000
Contractor Markup, Mob/demob, Insurance		%	10	8,000
Engineering, Permitting and Construction Management		%	20	16,000
Regulatory Oversigh		%	2.5	2,000
Subtotal - Capping				**104,000**
Estimated Capital Costs - Subtotal				**267,600**
Contingency		%	25	67,000
Estimated Capital Costs - Total				**335,000**

Operation and Maintenance and 5-year Review Cost Estimates
Alternative F3 - Capping and Institutional and Access Controls

Description	Quantity	Units	Unit Rate	Estimated Cost
Estimated Operation & Maintenance Costs:				
Land use monitoring (inspection) and letter report	1	each	3,000	3,000
Enforcement of Institutional Controls (attorney fees)	1	year	1,500	1,500
Estimated O&M Costs - Subtotal				4,500
Contingency		%	25	1,100
Estimated O&M Costs - Total				**5,600**

Present Worth Cost Estimate
Alternative F3 - Capping and Institutional and Access Controls

Year	*n*	P/F(*i*=7%)	Estimated Capital Costs ($)	Estimated O&M Costs ($/yr)	Estimated 5 - year Review Costs ($)	Total Costs ($)	Present Worth of Costs ($)	Cumulative Present Worth ($)
2005	0	1.00000	335,000			335,000	335,000	335,000
2006	1	0.93458		5,600		5,600	5,000	340,000
2007	2	0.87344		5,600		5,600	5,000	345,000
2008	3	0.81630		5,600		5,600	5,000	350,000
2009	4	0.76290		5,600		5,600	4,000	354,000
2010	5	0.71299		5,600	8,100	13,700	10,000	364,000
2011	6	0.66634		5,600		5,600	4,000	368,000
2012	7	0.62275		5,600		5,600	3,000	371,000
2013	8	0.58201		5,600		5,600	3,000	374,000
2014	9	0.54393		5,600		5,600	3,000	377,000
2015	10	0.50835		5,600	8,100	13,700	7,000	384,000
2016	11	0.47509		5,600		5,600	3,000	387,000
2017	12	0.44401		5,600		5,600	2,000	389,000
2018	13	0.41496		5,600		5,600	2,000	391,000
2019	14	0.38782		5,600		5,600	2,000	393,000
2020	15	0.36245		5,600	8,100	13,700	5,000	398,000
2021	16	0.33873		5,600		5,600	2,000	400,000
2022	17	0.31657		5,600		5,600	2,000	402,000
2023	18	0.29586		5,600		5,600	2,000	404,000
2024	19	0.27651		5,600		5,600	2,000	406,000
2025	20	0.25842		5,600	8,100	13,700	4,000	410,000
2026	21	0.24151		5,600		5,600	1,000	411,000
2027	22	0.22571		5,600		5,600	1,000	412,000
2028	23	0.21095		5,600		5,600	1,000	413,000
2029	24	0.19715		5,600		5,600	1,000	414,000
2030	25	0.18425		5,600	8,100	13,700	3,000	417,000
2031	26	0.17220		5,600		5,600	1,000	418,000
2032	27	0.16093		5,600		5,600	1,000	419,000
2033	28	0.15040		5,600		5,600	1,000	420,000
2034	29	0.14056		5,600		5,600	1,000	421,000
2035	30	0.13137		5,600	8,100	13,700	2,000	423,000
	Total Estimated Costs:		335,000					420,000

Alternative F4 Cost Estimates

Capital Cost Estimate
Alternative F4 - Soil Excavation and Consolidation in Area 2
(Soil Sampling, Establish Institutional Controls, Fence as Access Restriction, and Excavation of Soil)

Description	Quantity	Units	Unit Rate	Estimated Cost
Soil Sampling: 1 sample per 10 sq meters (196,000 sq ft area)				
Labor				
Field Technician Labor - assume 6 samples per hour	33	hour	75	2,500
Materials and equipment				
Soil sample kits	200	ea	5	1,000
Field instrumentation - gamma meter	4	day	100	400
Vehicle	4	days	100	400
Shipping of sample coolers	4	ship days	100	400
Analytical (28-day turn around time) [includes 1 duplicate per 10 samples]				
Isotopic uranium	220	ea	120	26,400
Isotopic thorium	220	ea	120	26,400
Radium-226/Radium-228	220	ea	170	37,400
Full electronic data packages (% of analytical costs)	90,200	%	10%	9,020
Data validation	220	ea	55	12,100
Reporting	1	event	10,000	10,000
Subtotal - Soil Sampling				**126,000**
Institutional Controls				
Labor to establish Institutional Control	1	LS	16,000	16,000
Subtotal - Institutional Controls				**16,000**
Fence for Access Restriction				
6' chain link fence and gates	900	ft	24.00	21,600
Subtotal - Access Restriction				**21,600**
Excavation of Soil with Radioactivity Above UMTRCA Standards				
Surveying	2	day	1,000	2,000
Silt fence	7,000	ft	2.00	14,000
Clearing/grubbing/regrading/preparation	4.50	acre	5,800	26,000
Excavate top 1' of soil and haul to Area 2	7,259	cu yd	10.15	74,000
Backfill top 1' of area of Lot 2A2 and Buffer Zon	7,259	cu yd	16.83	122,000
Excavation Construction - Subtotal				238,000
Contractor Markup, Mob/demob, Insurance		%	10	24,000
Engineering, Permitting and Construction Management		%	20	48,000
Regulatory Oversigh		%	2.5	6,000
Subtotal - Excavation of Soil and Haul to Area 2				**316,000**
Estimated Capital Costs - Subtotal				**480,000**
Contingency		%	25	120,000
Estimated Capital Costs - Total				**600,000**

Present Worth Cost Estimate
Alternative F4 - Soil Excavation and Consolidation in Area 2

Year	*n*	P/F(*i*=7%)	Estimated Capital Costs ($)	Total Costs ($)	Present Worth of Costs ($)	Cumulative Present Worth ($)
2005	0	1.00000	600,000	600,000	600,000	600,000
2006	1	0.93458		0	0	600,000
2007	2	0.87344		0	0	600,000
2008	3	0.81630		0	0	600,000
2009	4	0.76290		0	0	600,000
2010	5	0.71299		0	0	600,000
2011	6	0.66634		0	0	600,000
2012	7	0.62275		0	0	600,000
2013	8	0.58201		0	0	600,000
2014	9	0.54393		0	0	600,000
2015	10	0.50835		0	0	600,000
2016	11	0.47509		0	0	600,000
2017	12	0.44401		0	0	600,000
2018	13	0.41496		0	0	600,000
2019	14	0.38782		0	0	600,000
2020	15	0.36245		0	0	600,000
2021	16	0.33873		0	0	600,000
2022	17	0.31657		0	0	600,000
2023	18	0.29586		0	0	600,000
2024	19	0.27651		0	0	600,000
2025	20	0.25842		0	0	600,000
2026	21	0.24151		0	0	600,000
2027	22	0.22571		0	0	600,000
2028	23	0.21095		0	0	600,000
2029	24	0.19715		0	0	600,000
2030	25	0.18425		0	0	600,000
2031	26	0.17220		0	0	600,000
2032	27	0.16093		0	0	600,000
2033	28	0.15040		0	0	600,000
2034	29	0.14056		0	0	600,000
2035	30	0.13137		0	0	600,000
	Total Estimated Costs:		600,000			600,000